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09/920,222	08/01/2001	Robert B. Davies	4151-A4	5846

7590

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EXAMINER

LEE, EUGENE

ART UNIT

PAPER NUMBER

2815

DATE MAILED: 07/30/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/920,222

Applicant(s)

DAVIES, ROBERT B.

Examiner

Eugene Lee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 22 April 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-7, 28-33 and 37-51 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7, 28-33 and 37-51 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 47 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 47 recites the limitation "the pedestal" in line 3 of said claim. There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1 thru 3, 5 thru 7, 37, 38, 42, 43, 45, and 49 are rejected under 35 U.S.C. 102(b) as being anticipated by Kendall 3,881,244. Kendall discloses (see, for example, FIG. 15) an integrated circuit comprising a silicon substrate (low resistivity semiconductor substrate) 2, oxide material (dielectric region) 16, trench, isolation layer (dielectric sidewalls) 14, region (adjacent cavity) 25', and core material (conductive material) 12. The right side of the figure clearly shows an inductor I.

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Regarding claim 5, see column 3, lines 23-25 wherein the grooves are stated as 15 mils (37.5 microns) deep.

Regarding claims 37, 38, 42, 43, 45 and 49, Kendall discloses (see, for example, FIG. 15) an integrated circuit comprising a silicon substrate (low resistivity semiconductor substrate) 2, transistor element (active region) II, dielectric region, transistor (active component), trench, isolation layer (side-walls) 14, and metal core (high conductivity electroplated material) 12. The dielectric region is the general area where oxide layer 7 and isolation layer 14 are present (the area where the transistor is not). Multiple cavities are formed that include oxide layer 7 and layers 25'.

### ***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 4, 41 and 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kendall '244 as applied to claims 1-3, 5-7, 37, 38, 42, 43, 45, and 49 above, and further in view of Matsuzaki 06-120036. Kendall does not disclose the conductive material including copper. However, Matsuzaki discloses a semiconductor device comprising a trench 31 filled with copper. The copper serves as a conductive metal for an induction element such as an inductor. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to use

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copper in Kendall in order to form an inductor with good inductive properties and increased current capacity.

7. Claims 28 thru 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuzaki 06-120036 JPO in view of Kendall 3,881,244. Matsuzaki discloses (see, for example, figure 2) a semiconductor device comprising a substrate 61, insulating film (dielectric region) 32, and trench 31 filled with a high conductive material (first inductor and second inductor of electroplated conductive material). A first inductor is formed in the substrate 61 and a second inductor is formed in substrate 11. Matsuzaki does not disclose a cavity. However, Kendall discloses (see, for example, FIG. 15) a semiconductor device comprising an inductor I and an isolation region (cavity) 25. Kendall teaches (see, for example, column 7, lines 22-49) that this isolation region isolates different parts in an integrated circuit. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to include the isolation region (cavity) in order to isolate different parts of an integrated circuit so that no interference occurs between adjacent devices.

Regarding claims 31 and 32, see page 5 of translation wherein Matsuzaki discloses the coil as hundreds of micrometers.

8. Claims 39, 40, 47, 48, and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kendall 3,881,244. Kendall does not disclose the dielectric material and the array of cavities produce an effective dielectric constant at least ten percent lower than the first dielectric constant and wherein the effective dielectric constant is approximately 2.5. Note that the

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specification contains no disclosure of either the critical nature of the claimed dimensions of any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen dimensions or upon another variable recited in a claim, the Applicant must show that the chosen dimensions are critical. In re Woodruff, 919 F.2d 1575, 16 USPQ 2d 1934, 1936 (Fed. Cir. 1990). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use these value, since it has been held that discovering an optimum value of a result effective value involves only routine skill in the art. In re Boesch, 617 F. 2d 272, 205 USPQ 215 (CCPA 1980).

9. Claims 44 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kendall 3,881,244 as applied to claims 1 thru 3, 5-7, 37, 38, 42, 43, 45, and 49 above, and further in view of Farooq et al. 6,574,859 B2. Kendall does not disclose a die attach pad with a pedestal formed on a surface thereof, the substrate being mounted on the die attach pad with the pedestal positioned in the cavity so as to seal the cavity. However, Farooq discloses (see, for example, FIG. 1A) a circuit card (die attach pad) 10 connected to a substrate 4. The circuit card makes a card assembly so that a more complicated integrated circuitry is formed. It would have been obvious to one of ordinary skill in the art at the time of invention to include the circuit card (die attach pad) in order to form a more complicated integrated circuitry such as an IC card.

#### **Product-by-Process Limitations**

10. While not objectionable, the Office reminds Applicant that “product by process” limitations in claims drawn to structure are directed to the product, per se, no matter how actually

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made. *In re Hirao*, 190 USPQ 15 at 17 (footnote 3). See also, *In re Brown*, 173 USPQ 685; *In re Luck*, 177 USPQ 523; *In re Fessmann*, 180 USPQ 324; *In re Avery*, 186 USPQ 161; *In re Wethheim*, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); *In re Marosi et al.*, 218 USPQ 289; and particularly *In re Thorpe*, 227 USPQ 964, all of which make it clear that it is the patentability of the final product per se which must be determined in a “product by process” claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in “product by process” claims or *otherwise*. Note that applicant has the burden of proof in such cases, as the above case law makes clear. Thus, no patentable weight will be given to those process steps which do not add structural limitations to the final product.

### ***Response to Arguments***

11. Applicant's arguments with respect to claims 1-7, 28-33, and 37-51 have been considered but are moot in view of the new ground(s) of rejection.

In claims 1, 28, 37, 45, and 49, the new limitation “**electroplated** conductive material disposed within the trench” is a process limitation that describes how the conductive material is formed within a trench. However, it does not add any structural limitations to the conductive material itself. The presence of process limitations on product claims can not impart patentability to the product.

Regarding the applicant's argument on page 18, first paragraph that Kendall could not be interpreted as a trench with dielectric sidewalls bounding an inductance, the Examiner

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respectfully disagrees. Kendall clearly discloses (see, for example, FIG. 15) a core material having an inductance that is bounded by isolation layer (dielectric sidewalls) 14.

Regarding the applicant's argument on page 21 that the addition of copper as disclosed by Matsuzaki will not overcome the deficiencies of Kendall's teaching, the Examiner respectfully disagrees. Matsuzaki discloses copper as a high conductive material that is used in an inductor. Therefore, since Kendall also teaches an inductor, it would have been obvious to one of ordinary skill in the art to use copper, because of its high conductivity, as the material for Kendall's inductor.

### *Conclusion*

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.



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### **INFORMATION ON HOW TO CONTACT THE USPTO**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eugene Lee whose telephone number is 703-305-5695. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C. Lee can be reached on 703-308-1690. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Eugene Lee  
July 14, 2003



**EDDIE LEE**  
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